Chapter 12-7A-1
URBAN WILDLAND INTERFACE BUILDING TEST STANDARDS

EXTERIOR WALL SIDING AND SHEATHING, DIRECT FLAME EXPOSURE
STANDARD 12-7A-1

STATE FIRE MARSHAL

Exterior Wall Siding and Sheathing, Direct Flame Exposure

Sec. 12-7A-100

(a) ***Application.*** *The minimum design, construction and performance standards set forth herein for exterior wall siding and sheathing are those deemed necessary to establish conformance to the provisions of these regulations.*

(b) ***Scope.*** *This standard determines the fire safety performance of exterior walls of structures when exposed to direct flames.*

(c) ***Tested and Listed Materials.*** *Materials and assemblies which have been tested and listed by an approved testing agency for the intended purpose need not be individually re-tested. Such individually tested and listed materials and assemblies shall be subjected to the performance standard tests to determine their suitability for use in the exterior wall assembly.*

(d) ***Alternate Constructions.*** *This standard does not expressly require the use of specific materials or forms of construction. Combinations of materials and assemblies may be investigated and tested in accordance with these regulations, and if found to be substantially equivalent in performance may be given recognition for approval.*

(e) ***Referenced documents.***
1. *ASTM D4444. Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters*
2. *ASTM E603. Standard Guide for Room Fire Experiments*
3. *UBC 8-2 (1994). Standard Test Method for Evaluating Room Fire Growth Contribution of Textile Wall Coverings*

(f) ***Test Apparatus (see** Figure 1).*

1. ***Wall Assembly Test Module.*** *The module is designed to permit rapid installation and removal of wall assemblies. It consists of two adjustable non-combustible sidewalls attached to a metal frame, a non-combustible floor, and a non-combustible simulated soffit for siding tests that is substitutable for eave tests. The module permits a prefabricated 4 x 8 ft (1200 x 2400 mm) wall section to be inserted and sealed so that all edges are protected from fire.*
2. ***Burner.*** *A 4 x 39 in. (100 x 1000 mm) propane diffusion burner is used. Note: for propane diffusion, the burner box is filled with sand or mineral wool.*
3. ***Burner location.*** *The burner is positioned so that it is centered laterally and placed 0.75 in. (20 mm) from the wall. The top of the burner is 12 in. (300 mm) above the floor.*
4. ***Infrared imaging.*** *It is advantageous to use infrared imaging to monitor the temperature of the back of the wall assembly during tests of siding over sheathing.*

(g) ***Test Assembly.*** *At least three identical assemblies are prepared for each material tested.*

(h) ***Wall assembly materials and fabrication.*** *The wall assembly is made of the chosen cladding material applied to a 4 ft × 8 ft (1200 mm × 2400 mm) wall framed with 2 x 4 in.*

studs (typically 16 in. (410 mm) on center), according to the cladding manufacturer's directions. Other components of the wall assembly, such as building felt and sheathing, are chosen to meet the manufacturer's specifications and/or local building codes. The wall should be finished in a manner appropriate for exterior exposure, as specified by the manufacturer.

(i) ***Pretest Weathering of Walls (optional):***

1. ***Preparation.*** *The back of the wall assembly must be protected from water penetration by stapling or taping a 4 x 8 ft (1200 x 2400 mm) sheet of polyethylene film to the outside of the framing members (the side opposite the cladding) to protect the interior of the wall cavity from being wetted by overspray.*
2. ***Weathering.*** *Subject the assembly to weathering exposure by alternating 24-hr cycles of wetting and heating. A total of seven wetting/drying cycles, conducted over 14 consecutive days, constitutes the pretest weathering. Wetting is achieved with a spray rack that allows for a uniform distribution of 8 gal/min (30 L/min) over the exposed surface of the wall. The heating cycle consists of air heated at 125±5°F (50±2°C) impinging on the wall at 10 mph (17 km/hr or 4.5 m/s). The final 24-hr period is a drying cycle. The polyethylene film is removed after weathering is completed.*
3. ***Conditioning.*** *The weathered wall assemblies are stored for at least two weeks indoors with good air circulation at temperatures between 60 and 90°F (16 to 32°C) to allow excess moisture to evaporate.*

(j) ***Conduct of Tests.*** *The Protocol provides a test for exterior wall siding and sheathing, involving direct flame exposure from a gas burner to simulate the combustion of dry ornamental plant(s) in close proximity to a structure.*

1. ***Burner output.***
   - *i) Without the wall assembly in place, adjust the burner for 150 ± 8 kW output. Extinguish the burner.*
   - *ii) Fit the wall assembly into the test module, sealing the top and side edges with ceramic wool or comparable material.*
   - *iii) Measure the moisture content of the wooden members of the assembly using a moisture meter (see ASTM D4444).*
   - *iv) Center the burner laterally at a distance of 0.75 in. (20 mm) from the wall.*
   - *v) Ignite the burner and maintain flame exposure for 10 min, controlling for constant 150 ± 8 kW output. Note: If flame penetration of the wall is observed before 10 min elapses, extinguish the burner.*
2. ***Duration.*** *The test continues until flame penetrates the wall assembly, or until sustained flaming and smoldering combustion cease.*
3. ***Observations.*** *The time, location, and nature of flame penetration (if any) should be noted.*
4. ***Report*** *a description of the wall cladding material and details of the construction of the assembly; where flame penetration of the wall occurred (if any); when and why the test was terminated.*

(k) ***Conditions of Acceptance.***

1. ***Duration of direct flame exposure.*** *To pass this test standard, the wall siding and sheathing materials and assembly shall withstand 10 minutes of direct flame exposure with the absence of structural failure, flame penetration of the sheathing material, or sustained combustion of any kind.*
2. ***Sustained combustion*** *of any kind observed during or after the 10 minute direct flame exposure shall constitute failure of this test standard.*
3. ***Flame penetration*** *of the sheathing material at any time during the 10 minute direct flame exposure shall constitute failure of this test standard.*
4. ***Structural Failure*** *of the wall assembly at any time during or after the 10 minute direct flame exposure shall constitute failure of this test standard.*

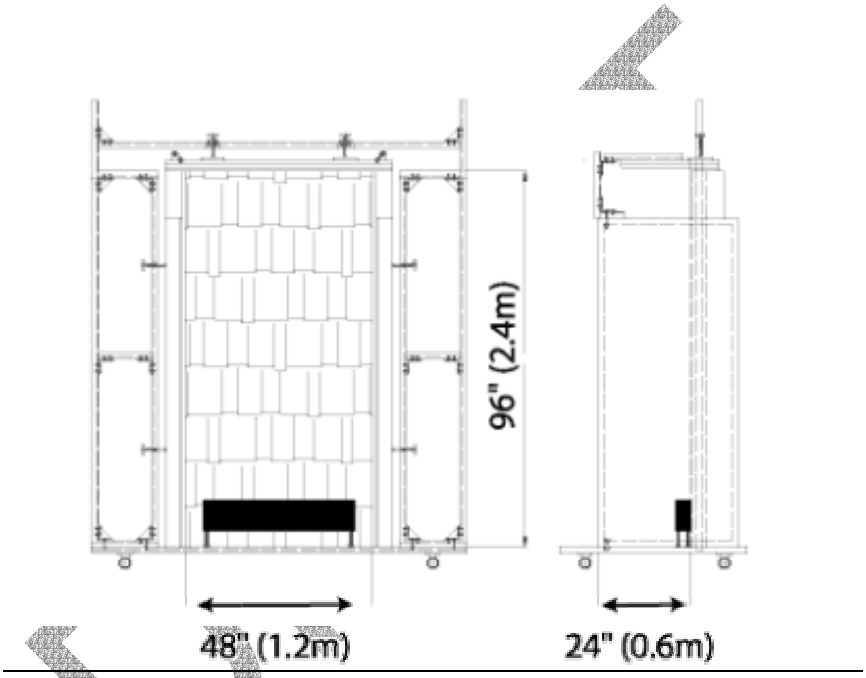

Figure 1. Diagram of the wall/eave assembly test module showing location of the burner.